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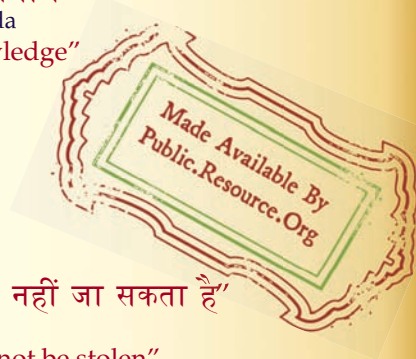
IS 15966 (2013): Refillable Welded Steel Cylinder for Liquefied Petroleum Gas (LPG) - Procedure for Checking Before, During and After Drilling [MED 16: Gas Cylinders]



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से पहले, उसके दौरान तथा भरण के बाद

Indian Standard

REFILLABLE WELDED STEEL CYLINDER FOR
LIQUEFIED PETROLEUM GAS (LPG) — PROCEDURE
FOR CHECKING BEFORE, DURING AND AFTER FILLING

ICS 23.020.30

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Division Council.

The purpose of this standard is to specify the procedures to be adopted when checking transportable refillable welded steel LPG cylinders before, during and after filling.

Some of the provisions given in the ISO 10691 : 2004 'Gas cylinders — Refillable welded steel cylinders for liquefied petroleum gas (LPG) — Procedures for checking before, during and after filling' are not in line with the provisions of *Gas Cylinder Rules*, 2004 which are statutory requirements in the country. However, considerable assistance has been taken from ISO 10691 in the formulation of this standard.

While implementing this standard, the manufacturer and the inspection agency shall ensure compliance with statutory regulations.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

REFILLABLE WELDED STEEL CYLINDER FOR LIQUEFIED PETROLEUM GAS (LPG) — PROCEDURE FOR CHECKING BEFORE, DURING AND AFTER FILLING

1 SCOPE

1.1 This standard specifies the procedures to be adopted when checking transportable refillable welded steel LPG cylinders before, during and after filling.

It applies to welded low carbon steel cylinders intended for storage and transportation of liquefied petroleum gas of nominal capacity exceeding 5 litre up to and including 250 litre water capacity. It does not apply to cylinders permanently installed in vehicles, or to plants and filling equipments.

1.2 This standard call for the use of substances and procedures that can be injurious to health, if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligation relating to health and safety at any stage. It has been assumed in the formulation of this standard that the execution of its provision is entrusted to appropriately qualified and experienced people. Where judgments are called for it has been assumed that they will be competent persons who have been trained specifically for the task.

2 REFERENCES

The standards listed below contain provisions, which through reference to this context constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
3710 : 1978	Filling ratios for low pressure liquefiable gases contained in cylinders
7241 : 1981	Glossary of terms used in gas cylinder technology

3 TERMS AND DEFINITIONS

For the purpose of this standard, the definitions given in IS 7241 and the following shall apply.

3.1 Competent Authority — Any national body or authority designated or otherwise recognized as such for any purpose in connection with this standard.

3.2 Competent Body — Person or corporate body, defined by the national or relevant authority, which by combination of appropriate qualification, training, experience and resources is able to make objective judgments on a subject.

3.3 Competent Person — Person who by a combination of training, experience and supervision is able to make objective judgments on a subject and is authorized by the incharge of the bottling unit.

3.4 Filling by Volume — Filling the cylinder with fixed volume of LPG.

3.5 Filling by a Level — Filling the cylinder to a fixed level using an ullage gauge.

3.6 Filling by Mass — Filling the cylinder with LPG using a weighing machine.

3.7 Reconditioning — Major repair of cylinders, including hot work, welding or de-denting (as permitted by the competent authority) and carried out by specialists away from the filling area.

3.8 Rejection — Putting out of service until final disposition is defined.

3.9 Periodic Inspection Test Station — Place approved by the Competent Authority where cylinders are tested and periodically inspected.

4 SEGREGATION OF CYLINDERS PRIOR TO FILLING

4.1 General

All the cylinders before taking for filling shall be scrutinized for leakage, visual damages and relevant markings. Cylinders shall be checked and segregated into the categories specified in 4.2 to 4.4.

4.2 Cylinders Suitable for Filling

Cylinders shall be deemed suitable for filling, if following conditions apply:

- a) Design code/specifications is identifiable;
- b) Tare weight and water capacity are marked;
- c) Product weight and product identification (LPG) are indicated when required;
- d) Cylinder is within the test date as determined from the marked periodic inspection date;

- e) Symbol of the periodic inspection test station or inspection body is indicated;
- f) A visual inspection of visible areas shows that the cylinder (including foot ring) and valve are free of defects as described in 4.4;
- g) Cylinder is not leaking;
- h) Cylinder is marked with maximum working pressure and test pressure in MPa;
- j) Filling company is identifiable; and
- k) In case of contact filling the traceability of the ownership of the cylinder for the company under contact shall be established.

4.3 Cylinders to be Subjected to Periodical Inspection

Cylinders falling in any of the following criteria shall be set aside for periodic inspection:

- a) Cylinder is beyond its test date;
- b) Cylinder cannot be confirmed to be within the test date; and
- c) Cylinder has markings that are obscured and not easily identified.

4.4 Cylinders Requiring Further Assessment

Where the initial segregation checks reveal any of the following defects, cylinders shall be subjected to further assessment, resulting in for example taring, reconditioning or rejection, in accordance with 5:

- a) Tare weight or indication of tare weight is missing or illegible;
- b) Cylinder is defective or damaged, for example

there is damage to shrouds, carrying handles or foot ring, or cylinder is dented or fire — damaged;

- c) Cylinder, valve or pressure relief valves (if fitted) are leaking or are damaged;
- d) Cylinder is found to have visible corrosion or, with cylinders with a welded foot ring, to exhibit corrosion at the weld; and
- e) Cylinder identified as not belonging to the filling company or of company not under contract for filling with filling company.

5 REASSESSMENT OF CYLINDERS

Cylinders that have been set aside (*see* 4.4) shall be examined by a competent person who shall decide whether they are suitable for filling or shall be sent for reconditioning or rejected.

Where, in case of cylinder that are intended to be filled by weight, the tare weight is missing or ineligible, the cylinders shall be reassessed and have the tare weight or indication of tare weight applied in accordance with the relevant marking requirements.

Leaking cylinders and cylinders with damaged or leaking valves shall be safely vented. Cylinders leaking from the body or from the weld joints shall be rejected. Leaking or damaged valves shall be replaced.

Cylinders which lose tare weight in excess of 5 percent of initial tare weight shall be rejected.

Rejection criteria guidelines for physical and material defects on the cylinder are given in Table 1 to Table 3.

Table 1 Physical Defects in the Cylinder Wall
(Clause 5)

Sl No.	Defects	Description	Rejection Limit
(1)	(2)	(3)	(4)
i)	Bulge	Visible swelling of the cylinder	Rejection in all cases
ii)	Dent	Depression in the cylinder that has neither penetrated nor removed the metal and its width at any point is greater than 2 percent of external cylinder diameter	a) Depth of dent is greater than 1/10th of the mean diameter of the dent, or b) Depth of the dent exceeds 25 percent of its width, or c) Dent on or adjacent to weld
iii)	Cut or intersection	Sharp impression where metal has been removed or redistributed	75 mm or more in length or when the depth of cut is such that the undamaged remaining wall thickness is less than the minimum calculated wall thickness
iv)	Intersecting cut	Point of intersection of two or more cuts	Rejection in all cases
v)	Dent containing cut	Depression in the cylinder within which there is cut or gouge	When the size of dent or cut exceeds the dimension for rejection as an individual defect
vi)	Crack	A split or rift in the cylinder shell	Rejection in all cases
vii)	Lamination	Layering of the material within the cylinder wall appearing as a discontinuity, crack. Lap or bulge at the surface	Rejection in all cases
viii)	Dig	A sharp depression where the surface material has been penetrated	75 mm or more in length and 4 mm or more in width

Table 2 Corrosion Defects in the Cylinder Wall
(Clause 5)

Sl No. (1)	Defects (2)	Description (3)	Rejection Limit (4)
i)	Isolated corrosion pits	Pitting of metal occurring in isolated areas not in excess of 6 mm diameter at a concentration not greater than 1pit/500 mm ² of surface area	Depth of penetration of any pit exceeds 0.4 mm ¹⁾
ii)	Area corrosion	Reduction in wall thickness over an area not exceeding 20 per cent of the cylinder surface including the ends	Depth of penetration of any pit exceeds 0.4mm ¹⁾
iii)	General corrosion	Reduction in wall thickness over an area exceeding 20 percent of the cylinder surface	Rejection in all the cases
iv)	Line corrosion	Series of pits or corroded cavities of limited width along the length or around corrosion circumference	a) Total length of corrosion in any direction exceeds 50 per cent of the circumference of the cylinder b) Depth of penetration exceeds 0.4 mm ¹⁾ c) Depth of corrosion cannot be measured
v)	Crevice corrosion	Crevice corrosion occurs in the area of the intersection of the foot ring or stay plate with the cylinder	When the depth of penetration exceeds 0.4 mm or when the depth of corrosion cannot be measured ¹⁾

¹⁾ Cylinders shall be rejected in case the observed thickness of the damaged remaining wall in the affected portion is less than the minimum calculated wall thickness.

Table 3 Other Defects
(Clause 5)

Sl No. (1)	Defects (2)	Description (3)	Rejection Limit (4)
i)	Depressed bung	Damage to the bung which alters the profile of the cylinder	Rejection in all cases
ii)	Arc or torch burns	Burning of the cylinder base metal, a hardened heat affected zone, the addition of extraneous weld metal, or removal of metal by scarfing or cratering	Rejection in all cases
iii)	Fire damage	Excessive general or localized heating of the cylinder usually indicated by charring or burning of paint: a) Fire damage of the metal b) Distortion of the cylinder c) Melting of metallic valve parts — Melting of safety cap	Rejection in all cases

NOTE — In case of superficial charring of paint cylinder may be accepted by inspecting officer.

6 FILLING

6.1 Safe Filling Quantity

Proper filling procedures shall be in place to ensure that no overfilling can occur.

The ratio of mass of LPG introduced in cylinder to the mass of water cylinder will hold at 15°C (filling ratio) shall not be exceeded as defined in IS 3710.

For cylinders used in a specific climate area, the competent authority may specify a maximum filling ratio for each mixture for national use.

6.2 Safe Filling Mixture and Composition

Cylinders shall be filled with the appropriate mixture and composition of LPG. Special care shall be taken to ensure that contaminants that could cause corrosion are not present in the LPG.

6.3 Accuracy of Weighing Equipment

Filling and check weigh scale shall be checked for accuracy at least once per working shift.

6.4 Filling Methods

Filling of cylinders may be by mass, volume or level. When filling by mass, the correct tare weight of individual cylinder shall be used for setting the filling scales. When filling is to a level, fixed liquid level device shall be checked for operability.

7 POST FILLING CHECKS

7.1 Check of Filled Amount

Each cylinder shall be checked to ensure that the maximum mass has not been exceeded, by check-weighing within tolerances as determined by relevant authority.

7.2 Action for Overfilled Cylinders

Over filled cylinders shall be corrected by removal of LPG and shall be rechecked.

7.3 Check for Leakage

- Cylinder shall be checked for leakages. Leaking cylinder shall be handled as per 5.

- b) For cylinders having valves provided with joint packing to have leak proof joint with adaptors, adequacy of the joint packing ('O' ring), to sustain the cylinder pressure at normal temperature and pressure shall be checked.

In case of leakage from the joint packing, the cylinder

shall be removed and joint packing shall be replaced. After replacement of joint packing, the cylinder shall be rechecked.

7.4 Capping and Sealing

Cylinder shall be checked prior to dispatch or storage for correct fitting of valve safety cap and sealing.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Gas Cylinders Sectional Committee, MED 16

<i>Organization</i>	<i>Representative(s)</i>
Petroleum and Explosive Safety Organization, Nagpur	SHRI P. B. YEDLA (Chairman) SHRI D. K. GUPTA (<i>Alternate</i>)
All India Industrial Gases Manufacturers Association, New Delhi	SHRI KARAN BHATIA SHRIMATI VEENA PETER (<i>Alternate</i>)
Bharat Petroleum Corporation Ltd, Mumbai	SHRI J. VEDAGIRI SHRI SANJAY PHULLI (<i>Alternate</i>)
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Kabsons Gas Equipments Ltd, Hyderabad	SHRI SATISH KABRA SHRI S. GOPALAIAH (<i>Alternate</i>)
Kosan Industries Ltd, Mumbai/Surat	SHRI S. K. DEY SHRI S. B. BOMAL (<i>Alternate</i>)
LPG Equipment Research Centre, Bangalore	SHRI G. P. GUPTA SHRIMATI KAROBI MUKHERJEE (<i>Alternate</i>)
Mahanagar Gas Limited, Mumbai	SHRI RAGHUNATH KULAI SHRI ARUN NAYAK (<i>Alternate</i>)
Maruti Koatsu Cylinders Ltd, Mumbai	SHRI NITIN J. THAKKAR SHRI A. S. SARAN (<i>Alternate</i>)
Ministry of Defence (DGQA), Pune	SHRI J. P. TIWARI LT-COL B. V. RAVI KUMAR (<i>Alternate</i>)
Praxair India Ltd, Bangalore	SHRI MILAN SARKAR SHRI ARINDAM DAS (<i>Alternate</i>)
Research & Development Estt (Engineers), Pune	SHRI P. K. CHATTOPADHYAY SHRI A. BASU (<i>Alternate</i>)
Sakha Engineers Pvt Ltd, New Delhi	SHRI AMARJIT S. KOHLI

<i>Organization</i>	<i>Representative(s)</i>
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Steel Authority of India Ltd, Ranchi	SHRI DEBASHIS KARMAKAR DR B. K. JHA (<i>Alternate</i>)
Supreme Cylinders Ltd, Delhi	SHRI M. L. FATHEPURIA
Tata Motors Ltd, Pune	SHRI P. K. BANERJEE SHRI AMUL VERMA (<i>Alternate</i>)
Tekno Valves, Kolkata	SHRI Y. K. BEHANI SHRI R. BEHANI (<i>Alternate</i>)
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Member Secretary
SHRI VISHAL TOMER
Scientist 'C' (MED), BIS

Composition of Low Pressure Gas Cylinders Subcommittee, MED 16 : 2

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All India Industrial Gases Manufacturers Association, New Delhi	SHRI KARAN BHATIA SHRIMATI VEENA PETER (<i>Alternate</i>)
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